

### REMARKS

Claims 9-22 are pending in the present application.

New claims 20-22 find support in the specification at page 5, last paragraph to page 6, first paragraph.

No new matter has been added by way of the above-amendment.

### III Issues Under 35 USC 103(a)

Claims 9, 11, 13 and 15-19 are rejected under 35 U.S.C. 103(a) as being obvious over Caster et al. (US 7,025,851). Applicants respectfully traverse the rejection.

#### *[I-A] Advantages of the present invention*

The present invention relates to a polymerizable composition comprising: a cycloolefin mixture containing 0.1 to 50% by mole of a cycloolefin having, as a substituent group, a monovalent group including an aliphatic carbon-carbon unsaturated bond, a metathesis polymerization catalyst and a radical generating agent. The polymerizable composition can be polymerized into a molded object, with or without crosslinking. Also, the polymerizable composition can be polymerized and crosslinked directly onto a substrate to make a crosslinked resin composite.

The present inventors have surprisingly found that the heat resistance of the product can be improved by controlling the type and amount of crosslinking sites which react with a radical generator in the ring-opening polymer of cycloolefin. Specifically, the improved heat resistance was achieved by using a cycloolefin with a specific chemical structure in a specific ratio together with a metathesis polymerization catalyst and a radical generating agent.

This is exemplified in the experimental evidence in the specification. For a complete description of the experiments, the Examiner's attention is directed to the specification, however, a summary of the experiments is now described for the Examiner's convenience.

Two sheets of glass cloth were impregnated with the polymerizable composition of the present invention by roller pressing the two sheets in contact with the polymerizable composition between PTFE plates and then heating to a temperature sufficient to cause polymerization. The product is referred to as a prepreg, which also sometimes referred to as a "resin formed object."

Two copper foil films were coated with a silane coupling agent solution and then the prepreg was sandwiched between the two copper foil layers with the coated side of each copper foil layer in contact with the prepreg. The layered structure was then put into a mold and heat pressed to obtain a double sided copper clad laminate, which was a crosslinked resin composite.

The following table shows the properties of this crosslinked resin composite. The table can be found on page 37 of the specification but is now reproduced herein for the Examiner's convenience.

	Specific cycloolefin	Prepreg	Crosslinked resin composite material		
	5-vinyl-2-norbornene (mole %)	M <sub>w</sub>	T <sub>g</sub> (°C)	Heat resistance	Residual ratio (%)
Example 1	3.3	30,500	112	○	91
Example 2	4.7	29,600	109	○	94
Comparative Example 1	0	29,800	114	×	85

In this table is shown the weight-average molecular weight (M<sub>w</sub>) of the polymer in the prepreg, and the glass transition temperature (T<sub>g</sub>) and evaluation results of heat resistance and the residual ratio of the crosslinked resin in the crosslinked resin formed object constituting the single sided copper clad laminate. Examples 1 and 2 used a cycloolefin mixture which included

5-vinyl-2-norbornene, which is a cycloolefin having, as a substituent group, a monovalent group including an aliphatic carbon-carbon unsaturated bond, as presently claimed. This was compared to Comparative Example 1, which did not have in the cycloolefin mixture, a cycloolefin having, as a substituent group, a monovalent group including an aliphatic carbon-carbon unsaturated bond. As such, Comparative Example 1 does not fall within the instant claims.

The table shows that the inventive Examples 1 and 2 gave excellent heat resistance when compared to Comparative Example 1.

In addition, it was found that all of the crosslinked resin formed objects are crosslinked products of the thermoplastic resin because each of them has a glass transition point. However, it was also found that the crosslinked resin formed objects obtained with inventive Examples 1 and 2 have a higher crosslinking density because the residual ratios thereof are high when compared to Comparative Example 1.

Thus, the fact that the inventive polymerizable composition includes a cycloolefin having a monovalent group including a carbon-carbon unsaturated bond, the inventive polymerizable composition has superior properties to polymerizable compositions which include a cycloolefin but that cycloolefin does not have a monovalent group including a carbon-carbon unsaturated bond. It is Applicants' position that such a change in properties would be unexpected based on the cited references, and this fact is further explored below.

*[I-B] Patentable distinctions between Caster et al. and the Present Invention:*

Caster et al's disclosure is best described in the abstract, which is as follows:

A method for bonding a material to a first substrate surface that includes providing a catalyst at the first substrate surface and then contacting that surface with a material that undergoes a metathesis reaction to bond the material to the first substrate surface. There are two embodiments of this method—a coating process and an adhesive process. In the coating embodiment, the metathesizable material is contacted with the catalyst on the substrate surface so that it undergoes metathesis polymerization to form the coating. The adhesive process includes (a) providing a catalyst at the first substrate surface, (b) providing a metathesizable material between the first substrate surface and the second

substrate surface, and (c) contacting the catalyst on the first substrate surface with the metathesizable material so that the metathesizable material undergoes a metathesis reaction and bonds the first substrate surface to the second substrate surface

The metathesizable material of Caster et al includes cyclic alkenes such as norbornene monomers which undergo ring opening metathesis polymerization (ROMP) reactions. Caster et al's description of the types of norbornene monomers is astounding because of the number and variety of norbornene monomers that are included. Furthermore, it is noted that none of the exemplified embodiments of Caster et al. are encompassed by the inventive polymerizable composition which includes a cycloolefin having, as a substituent group, a monovalent group including an aliphatic carbon-carbon unsaturated bond. And yet, despite this fact, the Examiner has taken the position that the present invention is made obvious by Caster et al. Applicants respectfully disagree.

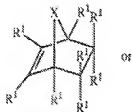
The fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a *prima facie* case of obviousness. *In re Baird*, 21 USPQ2d 1550, 1552 (Fed. Cir. 1994); *In re Jones*, 21 USPQ2d 1941, 1943 (Fed. Cir. 1992).

In *Baird*, there was an application claim for a flash fusible toner prepared using a bisphenol A. The Examiner rejected the application claim based upon a reference which taught a genus containing an estimated 100 million different diphenols simply because the reference genus encompassed bisphenol A. The Federal Circuit thought otherwise and overturned the Examiner's rejection.

Important facts which led to the court's conclusion were that the reference cited by the Examiner taught a genus containing a large number of variables. There was nothing in the disclosure of the reference to suggest that one would select the specific variables necessary to obtain bisphenol A. In fact, the specific examples appeared to teach away from the relatively simple formula of bisphenol A, since the specific examples had more complex formulas. The court reasoned that while the reference may suggest certain complex bisphenol A derivatives, it did not fairly suggest bisphenol A and therefore did not *motivate* the selection of bisphenol A.

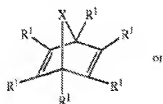
In the instant case, the Examiner appears to have analyzed the facts in a similar fashion to that which has been forbidden by *Baird*. The genus of norbornene monomers taught to be useful in Caster et al. includes Formula A through Formula D and Formula F.

(A)



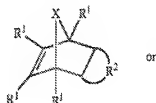
or

(B)



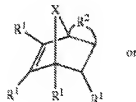
or

(C)



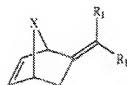
or

(D)



or

Formula F



wherein X is CH<sub>2</sub>, CHR<sup>1</sup>, C(R<sup>1</sup>)<sub>2</sub>, O, S, N-R<sup>1</sup>, P-R<sup>1</sup>, O=P-R<sup>1</sup>, Si(R<sup>1</sup>)<sub>2</sub>, B-R<sup>1</sup> or As-R<sup>1</sup>; each R<sup>1</sup> is independently H, CH<sub>3</sub>, alkyl, alkenyl (such as vinyl or allyl), cycloalkyl, cycloalkenyl, aryl, alkaryl, aralkyl, halogen, halogenated alkyl, halogenated alkenyl.

alkoxy, oxyalkyl, carboxyl, carbonyl, amido, (meth)acrylate-containing group, anhydride-containing group, thioalkoxy, sulfoxide, nitro, hydroxy, keto, carbamate, sulfonyl, sulfinyl, carboxylate, silanyl, cyano or imido;  $R^2$  is a fused aromatic, aliphatic or hetero cyclic or polycyclic ring; and  $R^3$  is alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, alkaryl, aralkyl or alkoxy. The carbon-containing R groups may have up to about 20 carbon atoms.

Clearly there are millions of possible compounds listed in this genus.

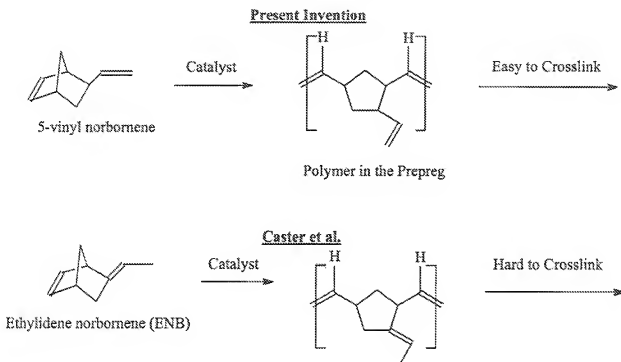
Also, as noted above, none of the exemplified embodiments of Caster et al. are encompassed by the inventive polymerizable composition which includes a cycloolefin having, as a substituent group, a monovalent group including an aliphatic carbon-carbon unsaturated bond. Accordingly, the artisan is not provided enough guidance to sift through all of the possible norbornene monomers of Formulae A-F to pick out one having a monovalent substituent groups having an aliphatic carbon-carbon unsaturated bond, as presently claimed.

Furthermore, the inventive polymerizable composition has superior properties over the composition of Caster et al. These superior properties are noted above in the "[I-A] *Advantages of the present invention*" section and are evidence of the nonobviousness of the present invention.

It is noted from the Examiner's comments in the outstanding Office Action that the Examiner is relying heavily on the fact that Caster et al. employ the use of ethylidene norbornene (ENB) which has "close structural similarity" to the 5-vinyl-norbornene which is used in the examples of the present specification and is encompassed by the instant claims. However, Applicants respectfully disagree with the Examiner's assessment. First, it is emphasized that ENB is not encompassed by the instant claims, since the ethylidene group is not a monovalent group as is required by the instant claims. Second, the Examiner does not appear to take into consideration the magnitude of the affect that this difference in structure (between ENB and 5-vinyl-norbornene) has on the properties of the composition.

In the inventive composition, polymerization would proceed to give the polynorbornene with a vinyl group as a pendant group. This is in distinction to the polymerization process of

Caster et al. which would proceed to give the polynorbornene with an ethylidene group as a pendant group. This is graphically shown now for the Examiner's convenience.



In the inventive composition, the vinyl pendant group is much easier to crosslink than the ethylidene pendant group of Caster et al.

Accordingly, the magnitude of the deleterious affect of the location of the double bond should be considered as a substantial factor weighing in favor of nonobviousness.

Based on the foregoing, the presently claimed invention, when considered as a whole, is not made obvious by Caster et al., and as such, withdrawal of the rejection is respectfully requested.

### **III Obviousness-type Double Patenting**

Claims 9-19 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of copending Application No. 10/567,782 in view of Caster et al. Applicants respectfully traverse.

Applicants note with appreciation that the Examiner has brought to Applicants' attention that there may be issues relating to Application No. 10/567,782. However, Applicants respectfully request that the Examiner follow the procedure described in MPEP 804(I)(B), which reads as follows:

The "provisional" double patenting rejection should continue to be made by the examiner in each application as long as there are conflicting claims in more than one application unless that "provisional" double patenting rejection is the only rejection remaining in one of the applications. If the "provisional" double patenting rejection in one application is the only rejection remaining in that application, the examiner should then withdraw that rejection and permit the application to issue as a patent, thereby converting the "provisional" double patenting rejection in the other application(s) into a double patenting rejection at the time the one application issues as a patent.

Applicants note that the claims in Application No. 10/567,782 were amended earlier this month, and it is Applicants' position that there are no double patenting issues remaining. Assuming *arguendo* that double patenting issues remain, the Examiner is requested to let the first case go to issue and deal with the double patenting issues in the remaining case.

In view of the above amendment, applicant believes the pending application is in condition for allowance.


Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq. Reg. No. 43,575 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.



If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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